Fresno Sanitary Landfill
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90-23

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9

In the matter of: Fresno Sanitary Landfill CITY of FRESNO, RESPONDENT Proceeding Under Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9604, 9606, and 9622), as amended by the Superfund Amendments and Reauthorization Act of 1986.	U.S. EPA Docket No. 90-23

ADMINISTRATIVE CONSENT ORDER

TABLE OF CONTENTS

I. AUTHORITY

A. This Consent Order is entered into pursuant to the authority vested in the President of the United States by Sections 104, 106 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (as amended by the Superfund Amendments and Reauthorization Act of 1986) ("CERCLA"), 42 U.S.C. §§ 104, 106, and 122. The President delegated this authority to the Administrator of the United States Environmental Protection Agency ("EPA" or "Agency") by Executive Order 12580, 52 Fed. Reg. 2923, and further delegated to the Assistant Administrator for Solid Waste and Emergency Response and the Regional Administrators by EPA Delegation Nos. 14-8-A and 14-14-C. This authority has been redelegated to the Director, Hazardous Waste Management Division, EPA, Region 9.

B. The City of Fresno ("Respondent"), consents to and agrees not to contest EPA's jurisdiction to enter into and enforce this Consent Order. Respondent is a municipal corporation duly organized and existing under, and by virtue of, the Constitution of the State of California and the Charter of the City of Fresno.

II. STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objectives of EPA and Respondent are:

A. To conduct the Remedial Investigation ("RI") described in the Remedial Investigation and Feasibility Study Scope of Work ("RI/FS Scope of Work"), a copy of which is attached as Attachment A and by this reference made a part of this Consent Order,

in order to determine fully the nature and extent of contamination and the potential for harm to the public health or welfare or the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at or from the Respondent's facility on West Avenue between Jensen Avenue and North Avenue in Fresno County, California (the "Site" or the "Respondent's facility"), as defined in Section III(A) below. The RI/FS Scope of Work requires Respondent to submit a detailed RI/FS Work Plan which specifies work to be performed during the RI, including, among other things, sediment and water sampling, soil core boring and sampling, monitoring well placement, ground water sampling, pumping and aquifer tests. It also includes a list of reports, documents, and other deliverables that Respondent will provide for EPA review, comment and/or approval.

B. To conduct the Feasibility Study ("FS") described in the RI/FS Work Plan for evaluating remedial action alternatives to prevent and eliminate the release or threatened release of hazardous substances, pollutants, or contaminants at or from the Site.

C. To undertake all actions required by the terms and conditions of this Consent Order in accordance with the provisions of CERCLA and the National Contingency Plan ("NCP"), 40 C.F.R. Part 300 et seq., as amended.

III. FINDINGS OF FACT

A. The Site was owned and operated by the Respondent as a landfill from 1937 until it was closed in 1989. The Respondent still owns the Site. The Site is approximately 145 acres in size

and is located adjacent to West Avenue between Jensen Avenue and North Avenue in Fresno County, California. The Respondent's facility does not contain liners, containment structures, leachate collection systems or leak detection systems. The Site has never been legally open for public dumping, however, the Respondent claims there is evidence that some dumping by the public has occurred in the past. The Site is bordered on the east and west by vineyards and agricultural fields. There is one residence on the north border of the landfill and four residences on the south border.

B. Onsite hydrogeologic conditions include unconsolidated alluvial sediments composed of silt, sand and gravel, derived from the Sierra Nevada mountains to the east. Drilling data from near the perimeter of the Site indicate the uppermost 100 feet of sediments are composed of four relatively continuous sand units interbedded and interlensed with finer grained silts and clays.

C. Five separate aquifers have been recognized in the Fresno area, including the uppermost unconfined aquifer, which underlies the Site and has been designated as a sole-source drinking water aquifer. Depth to groundwater at the site varies from 52 to 59 feet below the surface. Eight municipal wells are located to the northeast (ugradient) within a three mile radius of the Site, with the nearest municipal well 1.4 miles away. The gradient of the groundwater movement is generally from the north-east to the southwest, and the Site is downgradient (southwest) of the urnabized area. Water from these wells feeds into a blended system that serves the Respondent. The general distribu-

tion area serves a population of approximately 350,000.

D. The Respondent has detected at least twenty hazardous substances in the groundwater at the Site. Most of the hazardous substances detected in the groundwater aquifer thus far are volatile organic compounds, including, vinyl chloride, tetrachloroethene, trichloroethene, methylene chloride, and trans-1,2-dichloroethene.

E. On October 4, 1989 (54 Fed. Reg. 41015) the Site was placed on the National Priorities List (NPL) as defined in Section 105 of CERCLA (42 U.S.C. §9605).

IV. CONCLUSIONS OF LAW

A. The Site is a "facility" as defined in Section 101 (9) of CERCLA, 42 U.S.C. § 9601 (9).

B. Respondent is a "person" as defined in Section 101 (21) of CERCLA, 42 U.S.C. § 9601 (21).

C. The chemicals and their constituents at the Site are "hazardous substances" as defined in Section 101 (14) of CERCLA, 42 U.S.C. § 9601(14).

D. The past, present, and potential migration of hazardous substances from the Site constitutes an actual or threatened "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

E. Respondent is a potentially responsible party pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

V. DETERMINATIONS

A. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endanger-

ment to the public health or welfare or the environment.

B. The actions required by this Consent Order are necessary to protect the public health, welfare and the environment.

VI. WORK TO BE PERFORMED

All response work performed pursuant to this Consent Order shall be under the direction and supervision of a qualified professional engineer or a certified geologist with expertise in hazardous waste site investigation. Within 30 days prior to initiation of site work, Respondent shall notify EPA in writing of the name, title, and qualifications of such engineer or geologist and of any contractors and/or subcontractors to be used in carrying out the terms of this Consent Order. The qualifications of the persons undertaking the work for Respondent shall be subject to EPA's review, for verification that such persons meet the minimum technical background and experience. If EPA disapproves, in writing, the technical qualifications of any persons(s), Respondent shall notify EPA within 30 days of the written notice, of the identity and qualifications of the replacement(s). If EPA subsequently disapproves of the replacement(s), EPA reserves its right under CERCLA and the NCP to conduct a complete RI/FS, and to seek reimbursement for costs from Respondent.

It is hereby AGREED TO AND ORDERED that the following work shall be performed by Respondent:

A. Respondent shall perform the tasks and submit reports contained in the RI/FS Scope of Work (Attachment A) and the approved RI/FS Work Plan. All such work shall be conducted in accordance with the RI/FS Scope of Work, the RI/FS Work Plan,

CERCLA, the NCP, and EPA guidance. EPA will prepare the Risk Assessment ("RA") portion of the FS pursuant to EPA Guidance. EPA will coordinate with Respondent to integrate the RA into the FS. Deliverables to be submitted by Respondent are listed below. This list includes the type of review that EPA will conduct (either "Review and Comment" or "Review and Approve"). EPA review, comment or approval may include review and comment by the California Department of Health Services and the Regional Water Quality Control Board and the Integrated Waste Management Board. Each deliverable should include the items listed with it, as well as items described in the RI/FS Work Plan. These specifics are meant as a framework for each deliverable's content. All draft deliverables must contain sufficient information to allow for EPA's detailed technical review and comment. Failure to submit sufficient information will be deemed a failure to submit that draft deliverable. Open discussions between Respondent and EPA will be necessary to assure that deliverables contain sufficient detail. Any reports, plans, specifications, schedules, and attachments required by this Consent Order are, upon approval by EPA, incorporated into this Consent Order. Non-compliance with such EPA-approved reports, plans, specifications, schedules, and attachments shall be considered a violation of this Consent Order and will subject Respondent to stipulated penalties in accordance with Section XII of this Consent Order.

1. Deliverables:

a) RI/FS Work Plan

Draft: Review and Comment

Final: Review and Approve

b) Monthly Status Reports

EPA Review and Comment

(1) A description of progress made during the reporting period.

(2) A summary of items submitted to EPA under the Consent Order during the reporting period.

(3) A list of samples submitted to chemical laboratories, including those for which analyses have been returned, and those for which analyses have not been returned during the reporting period.

(4) Results of all sampling and/or tests or other technical data generated by Respondent or on Respondent's behalf during the previous month.

(5) A description of work planned for the next two months with schedules included.

(6) A description of all problems encountered, solutions developed and implemented for those problems, and problems anticipated within the next two months.

c) Health and Safety Plan

EPA Review and Comment

d) Sampling and Analysis Plan ("SAP")

Draft: EPA Review and Comment

Final: EPA Review and Approve

e) Technical Memorandum on Modeling of Site Characteristics (where appropriate)

Draft: EPA Review and Comment

Final: EPA Review and Approve

f) Site Characterization Summary

Draft: EPA Review and Comment

Final: EPA Review and Approve

g) Remedial Investigation Report

Draft: EPA Review and Comment

Final: EPA Review and Approve

h) Technical Memorandum Identifying Candidate Technologies

Draft: EPA Review and Comment

Final: EPA Review and Approve

i) Treatability Testing Statement of Work (if necessary)

Draft: EPA Review and Comment

Final: EPA Review and Approve

j) Treatability Testing Work Plan (if necessary)

Draft: EPA Review and Approve

Final: EPA Review and Approve

k) Treatability Study Site Health & Safety Plan (if nec.)

EPA Review and Comment

l) Treatability Study Evaluation Report (if necessary)

Draft: EPA Review and Comment

Final: EPA Review and Approve

m) Technical Memorandum Documenting Revised Remedial Action Objectives

EPA Review and Comment

n) Technical Memorandum on Remedial Technologies, Alternatives and Screening

EPA Review and Comment

o) Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives

Draft: EPA Review and Comment

Final: EPA Review and Approve

p) Feasibility Study Report

Draft: EPA Review and Comment

Final: EPA Review and Approve

This work shall be consistent with all applicable requirements of CERCLA and the NCP and shall be conducted in accordance with EPA RI/FS guidances ("Guidance for Conducting Remedial Investigations Feasibility Studies Under CERCLA," October, 1988 or any EPA updates or revisions to those guidances, and with the standards, specifications, and schedule contained in the approved RI/FS Work Plan.

B. EPA shall, as indicated above, review, comment upon, and approve or disapprove each report, document or other deliverable. Within the time period scheduled for review of Respondent's submittals, EPA shall notify Respondent in writing of EPA's approval, disapproval or if additional review time is required. In the event of any disapproval, EPA shall specify the reasons for such disapproval and recommended modifications.

1. Within 30 days, or more if needed, of receipt of Respondent's draft submittals pursuant to subparagraphs A.1.(a), (d), (e), (f), (h), (i), (j), (k), (l), and (o), EPA shall submit

to Respondent its comments. Respondent shall submit its final deliverable incorporating EPA's comments within 30 days of receiving EPA's comments. For the purposes of this Consent Order, "day" means calendar day unless otherwise specified in this Consent Order.

2. Within 45 days, or more if needed, of receipt of Respondent's draft submittals pursuant to subparagraphs A.1.(g) and (p), EPA shall submit to Respondent its comments. Respondent shall submit its final deliverables incorporating EPA's comments within 45 days of receiving EPA's comments.

3. Respondent may begin Dispute Resolution (Section XI) procedures, if appropriate, after it receives EPA's approval or disapproval of the amended deliverable.

4. Respondent's deadlines will be extended for an amount equal to any extra time needed by EPA beyond the time specified above to review and comment on the above deliverables.

C. In the event of unanticipated or changed circumstances at the Site, Respondent shall notify the EPA Project Coordinator by telephone within 24 hours of the discovery of the unanticipated or changed circumstances.

D. EPA shall have the right to modify the RI/FS Work Plan as it determines necessary after consulation with the Respondent, except for shortening the schedule of work to be performed.

E. EPA may determine that additional RI/FS tasks, including, but not limited to, remedial investigation work, engineering evaluation, interim response measures or tasks added as a necessary part of the RI/FS. Respondent agrees to implement any addi-

tional tasks which EPA determines are necessary as part of the RI/FS. Additional work shall be completed in accordance with the standards, specifications, requirements, and schedules determined or approved by EPA.

F. Documents, including progress and technical reports, approvals, disapprovals, and other correspondence to be submitted pursuant to this Consent Order, shall be sent to the following addressees or to such other addresses as the parties hereafter may designate in writing, and shall be deemed submitted on the date received by EPA or Respondent.

1) Documents to be submitted to EPA shall be sent to:

Mr. Bret C. Moxley
Remedial Project Manager (H-6-2)
Hazardous Waste Management Division
U.S. EPA, Region 9
1235 Mission Street
San Francisco, CA 94103

Copies shall be sent to:

Mr. Earl Krivanec
ICF Technology, Inc.
160 Spear Street
Suite #1380
San Francisco, CA 94105

Mr. Frank Lopez
California Department of Health Services
10151 Croydon Way
Sacramento, CA 95827

Mr. Chris Sanders
California Regional Water Quality Control Board
Central Valley Region
3614 East Ashland Avenue
Fresno, CA 93726-6905

2) Documents to be submitted to Respondent shall be sent to:

Mr. Marvin D. Johnson, Director
City of Fresno Public Works Department
2326 Fresno Street
Fresno, CA 93721

A copy shall be sent to:

Mr. Wayne Pickus
Environmental Engineer
Camp Dresser & McKee
One Walnut Creek Center
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596

VII. DESIGNATED PROJECT COORDINATORS

A. EPA hereby designates Mr. Bret C. Moxley, address set forth in Section VI(F) above, as Project Coordinator who shall have the authorities, duties, and responsibilities vested in the Remedial Project Manager by the National Contingency Plan. The EPA Project Coordinator will be EPA's designated representative at the Site. Respondent hereby designates Mr. John Mitchell, address set forth in Section VI(F) above, as Project Coordinator who shall be responsible for overseeing the implementation of this Consent Order. To the maximum extent possible, all oral communications between Respondent and EPA concerning the activities performed pursuant to this Order shall be directed through the Project Coordinators. All documents, including progress and technical reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Consent Order, shall be delivered in accordance with Section VI(F) above.

B. EPA and Respondent may change their respective Project Coordinators. Such a change shall be accomplished by notifying the other party in writing at least one week prior to the change.

C. Consistent with the provisions of this Consent Order, the EPA Project Coordinator shall also have the authority vested in the On-Scene-Coordinator ("OSC") by the NCP, unless EPA desig-

nates a separate individual as OSC, who shall then have such authority. This includes, but is not limited to, the authority to halt, modify, conduct, or direct any tasks required by this Consent Order and/or under take any response actions (or portions of the response action) when conditions present or may present a threat to public health or welfare or the environment as set forth in the NCP.

D. The absence of the EPA Project Coordinator or OSC from the Site shall not be cause for the stoppage of work.

VIII. SITE ACCESS

A. To the extent that Respondent requires access to land other than land it owns, Respondent will use its best efforts to obtain access agreements from the present owners or lessees within 30 days of a determination by Respondent or EPA that such access is necessary. For the purposes of this paragraph, "best efforts" include, but are not limited to, providing reasonable compensation as consideration for access. Such access agreements shall provide reasonable access for EPA, its contractors and oversight officials, the state and its contractors, and Respondent or its authorized representatives. In the event that Respondent is not able to obtain site access to property owned or controlled by persons or entities other than Respondent at least 30 days prior to field activities planned pursuant to this Consent Order, Respondent shall promptly notify EPA regarding both the lack of, and efforts to obtain, such access.

B. No conveyance of title, easement, or other interest in the property comprising the Site shall be consummated without a

provision permitting the continuous implementation of the provisions of this Consent Order.

C. Respondent shall permit EPA, or its authorized representatives, to have reasonable access at all times to the Site to monitor any activity conducted pursuant to the RI/FS work plan or conduct such tests or investigations as EPA deems necessary. Nothing in this Consent Order shall be deemed a limit upon EPA's authority under federal law to gain access to the Site.

IX. SAMPLING, ACCESS, AND DATA/DOCUMENT AVAILABILITY

A. Respondent shall provide EPA with all information regarding hazardous substance contamination at, or released from, the Site, including:

- The results and Quality Assurance/Quality Control (QA/QC) documentation of all sampling and/or tests or other technical data generated by Respondent or on Respondent's behalf with regard to soil, ground water, surface water, or air contamination by hazardous substances, pollutants, or contamination at the Site. Details and documentation of all sampling and analysis data collection completed during the previous month shall be presented in a monthly status report;

- Previous studies or reports;

- Communications between Respondent and local, state or other federal authorities;

- Permits from local, state or federal authorities regarding hazardous substance use or contamination at the Site.

B. At the request of EPA, Respondent shall provide split or duplicate samples to EPA and/or its authorized representatives of

any samples collected by Respondent as part of the RI/FS work plan. Respondent shall notify EPA of any planned sample collection activity in the preceding monthly report.

C. Respondent shall use quality assurance, quality control, and chain of custody procedures described in the "EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, EPA-330/9-78-001-R and "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, " December 1980, QAMS-005/80, and any EPA updates or revisions to these guidances, while conducting all sample collection and analysis activities required by the Consent Order. Respondent shall consult with EPA in planning for and prior to, all sampling and analysis as detailed in the RI/FS work plan. To provide quality assurance and maintain quality control, Respondent shall:

1. Use a laboratory which has a documented Quality Assurance Program that complies with EPA guidance document QAMS-005/80.

2. Ensure that EPA personnel and/or EPA authorized representatives are allowed access to the laboratory and personnel utilized by Respondent for analysis.

3. Ensure that the laboratory used by Respondent for analysis, performs according to a method or methods deemed satisfactory to EPA and submits all protocols to be used for analysis to EPA at least 10 days before beginning analysis.

D. Respondent shall permit EPA, and its authorized representative to have reasonable access at all times to the Site to monitor any activity conducted pursuant to the RI/FS work plan

or conduct such tests or investigations as EPA deems necessary.

E. Respondent shall permit EPA and/or its authorized representative to inspect and copy all records, documents, and other writings, including all sampling and monitoring data, that in any way concern soil, ground water, surface water or air contamination at the site. Nothing in this Consent Order shall be interpreted as limiting EPA's inspection authority under federal law.

F. Respondent may assert a confidentiality claim, covering part or all of the information requested by this Consent Order pursuant to 40 C.F.R. § 2.203(b). Analytical data and data covered by Section 104(e)(7)(F) of CERCLA (42 U.S.C. § 9604(e)(7)(F) shall not be claimed as confidential by Respondent and shall be provided to EPA by Respondent. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to Respondent.

G. If, at any time during the RI/FS process, Respondent becomes aware of the need for additional data beyond the scope of the RI/FS work plan, Respondent shall have an affirmative obligation to submit to the EPA Project Coordinator within 20 days a memorandum documenting the need for additional data.

H. All data, factual information, and documents submitted by Respondent to EPA pursuant to this Consent Order shall be subject to public inspection.

X. RECORD PRESERVATION

Respondent agrees that it shall preserve, during the pendency of this Consent Order and for a minimum of six (6) years after the final Record of Decision for the Site has been signed, a central depository of the records and documents required to be prepared under the RI/FS work plan. Respondent shall acquire and retain copies of all documents that relate to hazardous waste contamination at the Site and are in the possession of its employees, agents, accountants, contractors, or attorneys. After this six year period, Respondent shall notify EPA at least 30 days before the documents are scheduled to be destroyed. If EPA requests that the documents should be saved, Respondent shall, at no cost to EPA, provide EPA with the documents or copies of the documents.

XI. DISPUTE RESOLUTION

If Respondent objects to any EPA decisior pursuant to Section VI(B), (D), or (E), Respondent shall notify EPA in writing of its objections within fourteen (14) calendar days of receipt of the decision. EPA and Respondent will then have an additional fourteen (14) calendar days from receipt by EPA of the notification of objection to reach agreement. At the end of the fourteen (14) day discussion period, EPA shall provide a written statement of its decision from the Assistant Director for Superfund to Respondent. Respondent shall then implement EPA's decision. Use of the dispute resolution provision will not relieve Respondent's duty to complete the other tasks in a timely manner in accordance with the schedule. This dispute resolution provision or EPA's

decision pursuant to this provision does not grant or imply jurisdiction to any court to review EPA's decisions pursuant to this Consent Order.

XII. STIPULATED PENALTIES

A. Except with respect to any extensions allowed by EPA in writing, or excused by the provisions of Section XIII (Force Majeure), for each day in which Respondent fails to submit a report or document, or in which Respondent otherwise fails to achieve the requirements of this Order, Respondent agrees to pay the sum set forth below as stipulated penalties. These penalties shall accrue commencing upon the earliest of the following occurrences: Respondent's receipt of the written determination of disapproval, as specified in Section VI; the failure of Respondent to meet the schedule specified or modified by EPA in the RI/FS Scope of Work or RI/FS Work Plan; or Respondent's receipt of written notice from EPA that a violation of this Consent Order has occurred. These penalties are not subject to Dispute Resolution (Section XI). Dispute Resolution shall not stay the accrual of these stipulated penalties.

B. Stipulated penalties shall accrue according to the following schedule:

1. For each day that Respondent fails to submit an adequate or timely Monthly Status Report pursuant to Section VI(A)(1) subparagraph (b), Respondent shall pay $500 per day.

2. For each day that Respondent fails to submit adequate or timely interim deliverables pursuant to Section VI(A)(1) subparagraphs (a), (c), (d), (e), (f), (h), (i), (j), (k), (l),

(m), (n), and (o), and for each day of any failure to otherwise achieve the requirements of this Consent Order, Respondent shall pay the following:

Days 1-7	$ 500/day
Days 8-14	$1,000/day
Days 15-30	$2,000/day
After 30 days	$5,000/day

2. For each day that Respondent fails to submit adequate or timely major deliverables pursuant to Section VI(A)(1) subparagraphs (g), Remedial Investigation Report, or (p), Feasibility Study Report, Respondent shall pay:

Days 1-7	$ 5,000/day
Days 8-14	$10,000/day
Days 15-30	$15,000/day
After 30 days	$20,000/day

C. Respondent's payment of stipulated penalties shall be due upon demand by the Director, Hazardous Waste Management Division, U.S. EPA, Region 9, by certified check made payable to the United States Treasury and addressed to:

U.S. Environmental Protection Agency
Region 9, Attn: Superfund Accounting
P.O. Box 360863M
Pittsburgh, PA 15251

Respondent shall send a cover letter with any check and the letter shall identify the Site by name and make reference to this Consent Order. Respondent shall send simultaneously to the EPA Project Coordinator a notification of any penalty paid, including a photocopy of the check.

D. The stipulated penalties provisions do not preclude EPA

from pursuing any other remedies or sanctions which are available to EPA because of Respondent's failure to comply with this Consent Order. EPA will notify Respondent of its determination to pursue other remedies or sanctions.

XIII. FORCE MAJEURE

A. If an event occurs which causes delay in the achievement of the requirements of this Consent Order, Respondent shall have the burden of proving that the delay was caused by circumstances entirely beyond the control of Respondent, its contractors, and agents and that cannot be overcome by their due diligence. Economic hardship, normal inclement weather, and increased costs of performance shall not be considered events beyond the control of Respondent, their contractors, and agents and shall not trigger the force majeure clause. In the event of a force majeure, the time for performance of the activity delayed by the force majeure shall be extended for the time period of the delay attributable to the force majeure. The time for performance of any activity dependent on the delayed activity shall be similarly extended, except to the extent that the dependent activity can be implemented in a shorter time. EPA shall determine whether subsequent requirements are to be delayed and the time period granted for any delay. Respondent shall adopt all reasonable measures to avoid or minimize any delay caused by a force majeure.

B. When an event occurs or has occurred that may delay or prevent the performance of any obligation under this Consent Order, which Respondent believes is due to force majeure, Respon-

original."

dent shall notify by telephone the EPA Project Coordinator, or, in his/her absence, the Director of the Hazardous Waste Management Division of EPA, Region 9, within 24 hours of the commencement of such event. Oral notification shall be followed by written notification, made within seven business days of when Respondent knew or should have known of the event causing the delay or anticipated delay. The written notification shall fully describe: the reasons for the delay; the reasons the delay is entirely beyond the control of Respondent, its contractors, and agents; the anticipated duration of the delay; actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to mitigate the effect of the delay; and any aspects of the event which may cause or contribute to an endangerment to public health, welfare, or the environment.

C. Failure of Respondent to comply with the force majeure notice requirements will be deemed an automatic forfeiture of its right to request a delay.

D. If EPA and Respondent cannot agree that any delay in compliance with the requirements of this Consent Order has been or will be caused by the circumstances entirely beyond the control of Respondent, its contractors, and agents, or on the duration of any delay necessitated by a force majeure event, the dispute shall be resolved according to the dispute resolution provisions in Section XI. Respondent shall have the burden of proving by clear and convincing evidence: that the delay was caused by circumstances entirely beyond the control of Respondent, its con-

tractors, and agents; that reasonable measures were taken to avoid or minimize delay; and the necessity of the duration of the delay.

XIV. RESERVATION OF RIGHTS

Notwithstanding compliance with the terms of this Consent Order, including the completion of an EPA approved Remedial Investigation and Feasibility Study, Respondent is not released from liability, if any, for any actions beyond the terms of this Consent Order taken by EPA respecting the Site. EPA reserves the right to take any enforcement action pursuant to CERCLA and/or any other legal authority, including the right to seek injunctive relief, monetary penalties, and punitive damages for any violation of law or this Consent Order. EPA expressly reserves all rights and defenses that it may have, including EPA's right both to disapprove of work performed by Respondent and to request that Respondent perform tasks in addition to those detailed in the RI/FS work plan, as provided in this Consent order. EPA reserves the right to undertake removal actions and/or remedial actions at any time. EPA reserves the right to seek reimbursement from Respondent for such costs incurred by the United States.

XV. REIMBURSEMENT OF RESPONSE AND OVERSIGHT COSTS

A. EPA will submit to Respondent documentation for all response and oversight costs, including indirect costs, incurred by EPA associated with this site prior to the effective date of the Consent Order. In addition, no more often than annually, EPA shall submit to Respondent an documentation for all response and

oversight costs incurred by the U.S. Government with respect to this Consent Order. EPA's Cost Documentation Financial Management System summary reports shall serve as the documentation for payment demands. Respondent shall, within 30 calendar days of receipt of each accounting, remit a check for the amount of those costs made payable to the Hazardous Substance Response Trust Fund. Checks should specifically reference the identity of the site and be addressed to:

U.S. Environmental Protection Agency
Region 9, Attn: Superfund Accounting
P.O. Box 360863M
Pittsburgh, PA 15251

A copy of the transmittal letter shall be sent simultaneously to the EPA Project Coordinator.

B. EPA reserves the right to bring an action against Respondent pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of all response and oversight costs incurred by the United States related to this Consent Order and not reimbursed by Respondent as well as any other unreimbursed past and future costs incurred by the United States in connection with response activities conducted pursuant to CERCLA at this site.

C. Respondent is hereby notified that the California Department of Health Services (DHS) intends to assess the Respondent for fees pursuant to Section 25347.6 of the California Health & Safety Code. In accordance with this Section, DHS will categorize the size of the Site to determine the amount of the fee to be paid for DHS' oversight of the RI/FS. Nothing contained in this Consent Order shall be construed as an agreement or acceptance by Respondent to pay such a fee.

XVI. OTHER CLAIMS

A. This Consent Order does not release Respondent from any claim, cause of action or demand in law or equity.

B. In entering into this Consent Order, Respondent waives any right to seek reimbursement or present any claim under Sections 106, 111, or 112 of CERCLA, 42 U.S.C. §§ 9606, 9611, or 9612, for any work performed pursuant to this Consent Order and any modifications thereto.

C. Respondent shall bear its own attorneys fees and costs with respect to all matters associated with this Consent Order.

XVII. OTHER APPLICABLE LAWS

Respondent shall undertake all actions required by this Consent Order in accordance with the requirements of all applicable local, state, and federal laws and regulations unless an exemption from such requirements is specifically provided in this Consent Order.

XVIII. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

Respondent agrees to indemnify and hold the United States Government, its agencies, departments, agents, contractors, and employees, harmless from any and all claims or causes of action arising from or on account of acts or omissions of Respondent, its officers, employees, receivers, trustees, agents, or assigns, in carrying out the activities pursuant to this Consent Order. EPA is not a party in any contract involving the Respondent at the Site.

XIX. COMMUNITY RELATIONS/PUBLIC REVIEW

EPA will implement a Community Relations Program in accor-

dance with Agency policies, guidance documents, and public comment policy. Respondent shall participate in the community relations activities when deemed appropriate by EPA. The administrative record for selection of the remedial action, including the RI/FS Scope of Work and RI/FS Work Plan, will be available for public review in a repository near the Site.

XX. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

A. This Order is effective on the date signed by EPA.

B. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specification, schedules, and any other writing submitted by Respondent will be construed as relieving Respondent of its obligation to obtain such formal approval as may be required by this Consent Order.

C. Any deliverables, plans, technical memoranda, reports (other than progress reports), specifications, schedules and attachments required by this Consent Order are, upon approval by EPA, incorporated into this Consent Order.

XXI. PARTIES BOUND

This Consent Order shall apply to and be binding upon Respondent and EPA, their agents, successors, and assignees. No change in ownership or corporate status will alter Respondent's obligations under this Consent Order. The signatories to this Consent Decree certify that they are authorized to execute and legally bind the parties they represent to this Consent Order. Respondent shall provide a copy of this Consent Order to all contractors, sub-contractors, laboratories, and consultants retained to conduct any portion of the work performed pursuant to this

Consent Order within 14 calendar days of the effective date of this Consent Order or date of such retention. Respondent shall provide a copy of this Consent Order to any subsequent owner(s) or successor(s) before ownership rights are transferred.

XXII. NOTICE TO THE STATE

EPA is notifying the State of California pursuant to the requirements of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a), by providing the State a copy of this Consent Order and the RI/FS Scope of Work.

XXIII. TERMINATION AND SATISFACTION

The provisions of the Consent Order shall be deemed satisfied upon Respondent's receipt of written notice from EPA that Respondent has demonstrated, to the satisfaction of EPA, that all of the terms of this Consent Order, including any additional tasks which EPA has determined to be necessary, have been completed.

IT IS SO AGREED AND ORDERED:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

By: _____ Date: 9-21-90
Jeff Zelikson, Director
Hazardous Waste Management Division

CITY OF FRESNO

By: _____ Date: 9/18/90
Marvin D. Johnson, Director
Department of Public Works

Approved as to Form:

Date: 9-14-90

Harvey Wallace
City Attorney for Fresno
by James E. Oakley
Deputy City Attorney

SCOPE OF WORK

1.0 INTRODUCTION

The Fresno Sanitary Landfill (FSL) is approximately 145 acres and is located 4 miles southwest of the City of Fresno (City). The FSL was operated continuously as a municipal landfill from 1937 to 1989. The FSL was placed on the National Priorities List on October 4, 1989.

As a potentially responsible party, the City has committed to conduct a Remedial Investigation/Feasibility Study (RI/FS). The purpose of this RI/FS is to investigate the nature and extent of contamination at the FSL site, to assess the potential risk to human health and the environment, and to develop and evaluate potential remedial alternatives. The RI and FS are interactive and may be conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies. The purpose of this Scope of Work is to describe the background objectives and general scope of the RI/FS tasks as an attachment to the Consent Decree.

2.0 SITE BACKGROUND

2.1 Site Description

The FSL is bounded on the north by Jensen Avenue, on the east by West Avenue, on the south by North Avenue, and the west by agricultural fields. The area surrounding the landfill is primarily agricultural with one residence on the north boundary and four residences on the south boundary. The top of the landfill is roughly 60 feet above grade, and the refuse prism extends to about 25 feet below the surrounding grade. Groundwater depth varies between 52 and 59 feet below the surface. Eight municipal wells are located within 3 miles of FSL. Water from these wells feeds into a blended system serving 350,000 people.

Twenty volatile organic compounds (VOCs) have been detected in monitoring wells adjacent to and downgradient from FSL. Historic concentrations of VOCs in the groundwater include vinyl chloride (130 ppb), tetrachloroethene (230 ppb), trichloroethene (261 ppb), methylene chloride (130 ppb) and trans 1,2- dichloroethene (1,400 ppb). Limited on-site sampling for metals in groundwater has detected chromium, iron and manganese at elevated levels. Pesticides, pesticide residues, herbicides, PCBs and dioxins have not been sampled for in groundwater. Methane has migrated off-site on the east and west affecting nearby vineyards, and methane

barriers have been installed on the north and south to protect the residences. There are also 17 methane monitoring wells in place. Recently methane has been shown to be migrating past the methane barrier on the south of the landfill.

2.2 Site History

The FSL is owned and was operated by the City as a Class III Landfill, as defined in the current Title 23, Chapter 3, Subchapter 15 regulations (Discharges of Waste to Land). The FSL began accepting waste in the north section of the landfill in 1937. Short trenches were dug to a depth of 3 feet (eventually increased to a depth of 25 feet); waste was dumped into the trench by collection trucks, the pile was leveled off and compacted; a second trench was dug adjacent to the first trench; and, the dirt from the second trench was used to cover the waste fill. The landfill is not lined.

According to the Closure and Post-Closure Maintenance Plan prepared by Emcon (December 1989), from 1937 to 1964 the landfill received only domestic wastes from various sources. From 1964 until the site closed in 1989, the landfill received only municipal wastes collected by the City. The average waste stream consisted of 16,500 tons per month; the total waste quantity is approximately 4.7 million tons (assuming an in-place refuse density of 1,200 lbs/cubic yard), or 7.9 million cubic yards. According to Emcon's report, the landfill accepted approximately 500 pounds per day of waste from local convalescent homes and the Fresno Dialysis Center, with approval from the County Health Department. The time periods that these wastes were received is not known.

The City expanded the landfill to the south in 1945. Prior to this expansion an irrigation canal extended in an east-west direction through what is now the south portion of the landfill. After expansion, this canal was replaced with a pipeline that is currently in use and is covered by landfill material. In June, 1984 the edge of the pipeline was excavated and a video camera was drawn through the pipeline to check the pipe's integrity. This effort showed that the pipe sagged considerably. This sag is probably due to ground settling from the weight of the landfill overburden.

The City began the process of closing the landfill by filing a Negative Declaration with the California Regional Water Quality Control Board (RWQCB) in August, 1981. The FSL was first evaluated by the Superfund program as a result of a CERCLA Section 103 (c) notification filed by the City of Fresno Solid Waste Management Division on May 27, 1981. The California Department of Health Services (DOHS) conducted a preliminary inspection of the site in June 1984 in response to complaint letters from nearby residents. The Preliminary Assessment

determined that off-site migration of methane gas and a variety of hazardous volatile organic chemicals in the groundwater had been documented.

The problem of methane gas was first identified in June 1983, when the Fresno City Public Works Department and the County Health Department conducted a preliminary investigation using portable equipment. A methane monitoring system consisting of 17 methane monitoring wells have since been installed. In November 1984 the City installed methane migration barriers along the northern and southern boundaries of the landfill. The barriers are trenches 26 feet deep filled with rock, which have two horizontal perforated PVC pipes at depths of 12 and 19 feet which are vented passively to the surface.

Groundwater monitoring efforts have included sampling domestic private, irrigation and monitoring wells near the landfill. Sampling has been conducted by the City, DOHS, and the RWQCB. Samples have been analyzed for general mineral constituents, physical parameters, anions/cations, trace metals and EPA method 601 volatile organics.

Most recently EPA's Technical Assistance Team has sampled soil gases beyond the methane barriers for VOCs including vinyl chloride. Recent data show that methane and other VOCs have migrated past the methane barrier on the south of the landfill.

2.3 Summary of Past Investigations

A number of studies have been conducted at the FSL site by various investigators. The earliest investigation was conducted by Twining Laboratories in 1971 to evaluate the permeability and characteristics of materials between the landfill base and the groundwater table, in the southern part of the landfill, south of the extension of Annadale Avenue (ESA, 1988). CH2M Hill prepared a report in 1975 concerning potential expansion of the landfill to the west in the area south of Annadale.

BSK and Associates was retained to provide an initial assessment of groundwater contamination and methane migration in 1983. Six groundwater monitoring wells were installed around the perimeter of the landfill as part of that investigation. Those wells (the "W" series wells) are presently functional and are available for sampling.

Subsequent to their initial investigation, BSK installed additional groundwater monitoring wells and drilled several temporary boreholes for sampling of the groundwater (BSK, 1984; 1987A; 1987B). Four clusters of monitoring wells, each with 3 sampling intervals, were constructed using a rotary-wash rig (DW-1, DW-2, UW-1, and UW-2). The temporary groundwater sampling boreholes were drilled with a hollow-stem auger; groundwater was

sampled when first encountered and the hole then grouted to near the ground surface. These 19 boreholes (301 to 305, 400 to 407, 501, 502, and 601 to 604) are located west of the landfill.

Kenneth D. Schmidt and Associates (Schmidt, 1987) installed and developed a pilot extraction/pumping well, EW-1, to investigate aquifer characteristics at the site. No soil sampling was carried out during drilling of the boring; however, an SP/resistivity log was made in order to establish soil stratigraphy at the well location. The report describes the hydrogeology at the site and presents cross sections through or near the site. However, the geologic cross sections were developed, for the most part, on the basis of water well drillers' logs from wells as far as one mile from the site.

Earth Sciences (ESA) was retained in 1988 to refine and expand the geologic and groundwater database at the site. A Phase I and Phase II study were completed. Five monitoring wells and eight temporary wells were installed. ESA compiled and summarized all hydrogeologic data collected to that point, performed aquifer tests, and collected groundwater samples from site wells and nearby residential wells.

In accordance with California landfill regulations, BSK prepared a Solid Waste Assessment Test (SWAT) Report in 1986-1987. This was followed by an Air Quality SWAT prepared by Emcon in 1988. As part of the landfill closure, CH2M Hill prepared an EIR in 1988 and 1989 to document the impacts of the closure on the surrounding area. Emcon also prepared a Closure and Postclosure Maintenance Plan for the landfill closure process in December, 1989. A preliminary Feasibility Study that evaluated alternatives for groundwater remediation was completed by James M. Montgomery in September 1989.

The existing data generated by previous investigators will be summarized and presented in the RI/FS Work Plan as required by EPA guidance.

3.0 RI/FS OBJECTIVES

The overall goal of the RI is to determine the nature and extent of the threat posed by the release or threat of release of hazardous substances from the site. The RI is structured to obtain data which assists in the formulation of the risk assessment and the identification and evaluation of potential remedial technologies. The ultimate goal of the FS is to select a cost-effective remedial alternative which mitigates threats to and provides protection to public health, welfare, and the environment, consistent with the National Contingency Plan.

The RI/FS work plan is a flexible document specifying activities

to achieve the overall goals, which can be expanded, reduced, or eliminated with written approval from EPA based upon data analyzed during the project. Any change to the scope must be approved by the EPA.

The goals of the RI/FS will be fulfilled through the evaluation of data previously collected and additional data collected during the RI/FS activities. To supplement existing data, several remedial investigation activities are anticipated to be selected to characterize local hydrogeologic conditions and define the nature and extent of soil, soil gas, air and groundwater degradation attributable to the FSL. Ultimately, a recommended remedial action program for the site will be developed at the conclusion of the RI/FS program activities.

The RI/FS objectives for the FSL site have been preliminarily determined based on available information, to be as follows:

1. To determine the nature and extent of the contaminants migrating from the landfill refuse prism. This includes the determination of the lateral and horizontal extent of soil and groundwater contamination attributable to the site, and the direction and rate of contaminant migration.

Contaminant characterization shall include but will not be limited to an assessment of the volatile organics compounds (VOCs) including halogenated organic compounds, heavy metals, herbicides, pesticides or pesticide residues, PCBs and dioxins in the saturated zone. The vadose zone and ambient air shall be investigated to characterize the contaminants in these media.

2. To determine the transport mechanisms or pathways for contaminants migrating from the landfill refuse prism. Preliminarily, these pathways to be investigated shall include but are not limited to:

- Leachate contaminating the soil and groundwater.
- Landfill gas contaminating the soil and groundwater.
- Landfill gas contaminating the ambient air.
- Leachate and landfill gas contaminating surface water.

3. To identify a technology or technologies to be used in a conceptual design and evaluation for a cap over the landfill refuse prism. The objective of the cap is to limit water infiltration and to assist in the control of the release or migration of contaminants in landfill gas into the ambient air. The design for a cap shall provide surface water drainage controls.

4. To identify a technology or technologies to be used in a

conceptual design and evaluation for a landfill gas containment, control or extraction system. The objective of this system is to prevent the release or migration of contaminants in landfill gas into the unsaturated vadose zone soils, top soils, saturated zone soils or groundwater beyond the perimeter of the site. This system shall include control of the migration of landfill gas through both subsurface pathways and emissions through the landfill cover. This system may include containing or controlling the migration of contaminants in landfill gas into the vadose zone and underlying saturated zone soils or groundwater directly beneath the trash prism.

5. To identify a technology or technologies to be used in a conceptual design and evaluation for a groundwater remediation system. The objective of this groundwater control system is to contain and prevent the future migration of the contaminant plume in the groundwater, and to remediate the present groundwater degradation. This system may include a groundwater extraction component.

6. To identify a technology or technologies to be used in the conceptual design and evaluation for a system to treat or dispose of the contaminants in the incoming stream from the groundwater extraction system; an exception would be in-situ treatment. The development of any liquids treatment system shall include consideration of the treatment of landfill leachate and the gas condensate generated from the gas control system.

7. To identify a technology or technologies to be used in a conceptual design and evaluation for a system to treat the gas stream produced by the landfill gas containment, control or extraction system.

8. To develop a set of Applicable or Relevant and Appropriate Requirements (ARARs) which shall be applied as clean up standards and operational parameters for the remedial technologies employed.

9. To assure that the interrelationship of all proposed landfill remedial technologies be considered throughout the entire RI/FS process.

4.0 PRELIMINARY IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES AND GENERAL RESPONSE ACTIONS

The identification of preliminary remedial action objectives and general response actions is the first step in the alternative development process. The purposes of this exercise are:

. To better define the types and quality of data needed to delineate the extent of contamination;

. To identify data required to evaluate remedial action technologies, and

. To allow early identification of ARARs which may influence the scope of the RI activities.

This preliminary identification task is performed during the scoping of the entire project. It provides a framework to guide the formulation of the RI and FS activities which are established in the Work Plan.

A remedial action objective is a medium-specific standard for protecting human health and the environment. The objective consists of a definition of the contaminant of concern, the exposure route and the receptor, and an acceptable contaminant level, after site clean up, for each exposure route.

General response actions describe activities which, upon implementation, meet the requirements of the remedial action objectives. These actions are established by medium, with the possibility of a combination of response actions being required to fulfill a specific objective.

5.0 RI/FS TASKS

This section of the Scope of Work describes the approach to the RI, including a brief description of all the tasks that will be conducted during the RI.

Task 1 - Project Planning

- Subtask 1A - RI/FS Work Plan Completion
- Subtask 1B - Sampling and Analysis Plan
- Subtask 1C - Site Health and Safety Plan
- Subtask 1D - Meeting Attendance and Report Submission

Task 2 - Community Relations (EPA will assume all CR responsibilities)

Task 3 - Field Investigation/Site Characterization

- Subtask 3A - Fieldwork Support
- Subtask 3B - Surveying and Mapping
- Subtask 3C - Soil Gas Survey
- Subtask 3D - Hydrogeology Investigation
- Subtask 3E - Groundwater Investigation

Subtask 3F - Residential Well Sampling
Subtask 3G - Air Investigation
Subtask 3H - Surface and Subsurface Soil Investigation
Subtask 3I - RI Derived Waste

Task 4 - Sample Analysis/Data Validation

Task 5 - Data Evaluation

Task 6 - Risk Assessment (this will be conducted by EPA)

Task 7 - Remedial Investigation Report

Task 8 - Remedial Alternative Development

Task 9 - Alternatives Evaluation

Task 10 - Treatability Studies

Task 11 - Feasibility Study Report

5.1 Task 1 - Project Planning

Included in this task is the completion of the RI/FS Work Plan. The Work Plan will include all components in accordance with EPA guidance. The City will complete a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the site. The Work Plan will also require a conceptual site "model" describing the contaminant sources, and potential migration and exposure pathways and receptors. It must also include a process for and manner of identifying Federal and State ARARs (chemical-specific, location-specific and action-specific).

An extensive database for the site has been developed through the conduct of previous study work described in Section 2.3 of this document. The Work Plan will contain a list of the reports of investigations previously conducted by the City. The data obtained from these investigations will be utilized to the greatest extent possible during the course of the RI/FS. Prior to use of this data, an evaluation of the quality assurance/quality control procedures employed in obtaining the data will be performed. A determination will be made of the validity of the existing data before the information is incorporated into the RI/FS. The objective is to utilize the existing validated data.

Finally, the major part of the Work Plan is a detailed description of the tasks to be performed, information needed for

each task, information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA. This includes the deliverables set forth in this Scope of Work; a schedule for each of the required activities which is consistent with the RI/FS guidance; and a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management). Also included are monthly reports to EPA, meetings, and presentations to EPA at the conclusion of each major phase of the RI/FS.

Because the extent of contamination has not been fully defined, and the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. The City will submit a technical memorandum documenting the need for additional data and the Data Quality Objectives (DQOs), whenever such requirements are identified. In any event, the City is responsible for fulfilling additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS.

Sampling and Analysis Plan

The City will prepare a sampling and analysis plan (SAP) to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data meet DQOs. The SAP provides a mechanism for planning field activities and consists of a field sampling plan (FSP) and a quality assurance project plan (QAPP).

The City will implement an iterative monitoring program or study program identified in the SAP which will use analytical techniques sufficient to detect and quantify the concentration of contaminants and determine the migration of contaminants through the various media at the site. In addition, the City will gather data for calculations of contaminant fate and transport. This process is continued until the area and depth of contamination are known to the level of contamination established in the QA/QC plan and DQOs.

The FSP will define in detail the sampling and data-gathering methods that will be used on the project. It will include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (described below). In addition, the QAPP will address sampling procedures, sample custody, analytical procedures, and data reduction, validation, reporting and personnel qualifications. Field personnel will be available for

EPA QA/QC training and orientation where applicable.

Data Quality Objectives

Data Quality Objectives (DQO) are qualitative and quantitative statements specifying the required quality of the data necessary for each specific data use. DQOs are based on the concept that different data uses often require data of varying quality. As outlined in the DQO document (U.S. EPA, 1987a), DQOs are developed through a three-stage process. In stage 1, the conceptual site model outlining potential contaminant sources; types of
contaminants; their migration routes; and potential receptors are developed on the basis of existing information. The RI/FS objectives and potential remedial actions are also identified. Stage 1 establishes the framework for stage 2 when the collection of data is defined in terms of data use; the type, amount, and quality that is required; and the techniques to be used for the collection and analysis.

The DQO development process will be integrated with the project planning process in stage 3 and the results are reported in the Sampling and Analysis Plan (SAP). Documentation is reported detailing the expected types of samples needed for each medium to sufficiently represent the conditions of the site and the Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) of chemical analysis that will be required.

EPA will supply the City with a letter describing the DQOs and detection limits needed for the human health risk assessment. All other DQOs will be developed by the City subject to EPA approval.

The City will demonstrate in advance of field activities, to EPA's satisfaction, that each laboratory it may use is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection limits consistent with both QA/QC procedures and DQOs approved in the QAPP for the site by EPA. The laboratory must have and follow an approved QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods that would be used at this site for the purposes proposed, and QA/QC procedures approved by EPA will be used. If the laboratory is not in the CLP program, a laboratory QA program will be submitted for EPA review and approval. EPA may require that the the City submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specifications. The City will provide assurances that EPA has access to laboratory personnel, equipment and records for sample collection, transportation and analysis.

Site Health and Safety Plan

A health and safety plan will be prepared to conform with OSHA regulations and protocols. The health and safety plan will include the 11 elements described in the RI/FS Guidance, such as a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and site control. The City is aware that EPA does not "approve" the City's health and safety plan, but rather EPA reviews it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

5.2 Task 2 - Community Relations

The development and implementation of community relations activities are the responsibility of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, the City may assist by providing information regarding the site's history, participating in public meetings, or by preparing fact sheets for distribution to the general public. In addition, the City may establish a community information repository, at or near the site, to house one copy of the administrative record. The extent of the City's involvement in community relations activities is left to the discretion of EPA. The City's community relations responsibilities, if any, are specified in the community relations plan. All community relations activities conducted by the City in regard to FSL will be subject to oversight by EPA.

5.3 Task 3 - Field Investigations/Site Characterization

As part of the RI, the City will perform the activities described in this task, including the preparation of a site characterization summary. The overall objective of site characterization is to describe the lateral and vertical extent of contamination in order to determine 1) the potential threat to human health or the environment, and 2) to identify and evaluate potential remedial technologies. This is accomplished by determining a site's physiography, geology, and hydrology. Surface and subsurface pathways of migration will be defined. The City will also investigate the extent of migration of this contamination as well as its estimated volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the site.

During this phase of the RI/FS, the Work Plan, SAP, and Health and Safety Plan are implemented. Field data will be collected

and analyzed to provide the information required to accomplish the objectives of the study. The City will provide to EPA at least two weeks in advance of the field work a written description of the field work tasks and the planned dates for all field activities. The City will demonstrate that the laboratory and type of laboratory analyses that will be utilized during site characterization meets the specific QA/QC requirements and the DQOs of the site investigation as specified in the SAP. Activities in this phase are often iterative, and to satisfy the objectives of the RI/FS it may be necessary for the City to supplement the work specified in the initial Work Plan. The City will provide a monthly progress report and participate in meetings at major points in the RI/FS.

5.3.1 Subtask 3A - Fieldwork Support

The City will initiate this task upon approval of the Work Plan and the SAP by EPA. Fieldwork support will include, but is not limited to, obtaining access to the site or surrounding properties, procurement of equipment and subcontractors, scheduling laboratory services, and arranging site support activities as required, such as sample handling and shipment facilities. This task will continue concurrently with ongoing field tasks to assure adequate logistical support. As part of this task, the City will notify EPA at least 2 weeks prior to initiating field work so that EPA may adequately schedule oversight tasks. The City will also notify EPA in writing upon completion of field tasks.

5.3.2 Subtask 3B - Surveying and Mapping

A topographic map of the site and adjacent properties will be prepared under this task. The topographic map will be used as a base map for all remedial investigation activities to help identify locations for proposed groundwater monitoring wells and soil-gas probes. The map will provide the basis for defining the landfill boundary and topography. This will be useful in formulating the conceptual cap and drainage system design as part of the FS report.

The locations of all monitoring installations will be surveyed throughout the course of the RI. This includes groundwater monitoring wells, soil borings, soil-gas probes, and any other device implemented as part of the field work. In addition, the residential wells sampled as part of the RI will be surveyed for location and elevation.

5.3.3 Subtask 3C - Soil Gas Investigation

The objective of the soil gas investigation is two-fold: 1) to determine the pathways of subsurface migration of landfill gas, and 2) to define the extent of the off-site landfill gas

migration and consequent contaminant migration and deposition.

The first objective is addressed through the installation of a soil-gas probe monitoring network at the site. The network is designed to consider the local soil and rock conditions, the hydrogeologic setting, man-made pathways such as utility trenches, and the nature of the waste in terms of the potential for generating landfill gas. The probes shall be permanent installations, constructed in accordance with State requirements for landfill gas control and monitoring at closed disposal sites. In general, the probes are constructed at multiple depths in a borehole that extends to the maximum depth of the refuse in the vicinity of the monitoring point. The soil borings for the probes will be sampled in accordance with Subtask 3H.

The field work consists of borehole drilling by a licensed drilling contractor under the supervision of the design engineer or geologist. All wells shall be logged during drilling with a record of each borehole maintained. All probes will be plotted on a site plan with probe locations and elevations determined through field survey. The probe construction details, including probe material, type of filter pack, size and interval of perforations, and other pertinent information will be documented.

The second objective of this field investigation task will be the determination of the extent of existing off-site migration. Past monitoring data will be utilized to formulate a general understanding of the areas on which landfill gas has migrated. The general approach consists of starting at the landfill boundary and progressing away from the perimeter with a series of temporary soil gas probes. These probes may consist of 1/4 inch stainless steel tubes which are easily driven by hand to shallow depths or through the use of truck mounted equipment for greater depths. The definition of the soil-gas plume is required to determine the amount of area outside the refuse prism requiring remediation.

Potential remedial techniques to clean up the off-site soil gas will be considered during the development of this field investigation task. This may allow for the installation of components which will serve dual purposes meeting both investigatory requirements in addition to monitoring needs to determine the effectiveness of the remedial action.

Throughout the soil-gas investigation, gas samples will be taken to characterize the nature of the landfill gas. Analysis will focus on the organic constituents in the gas with this information being utilized in the risk assessment. Gas samples may be taken from both the perimeter monitoring network and as part of the off-site migration investigation at various distances from the refuse prism boundary.

5.3.4 Subtask 3D - Hydrogeologic Investigation

As described in Section 2.3, a considerable amount of work has been conducted to determine the hydrogeologic characteristics of the site. The objective of this task will be not to reproduce or duplicate previous work, but to conduct a focused investigation in areas where data are lacking. Data from this task will be used to determine potential pathways for contaminant migration in the subsurface. The effects of seasonal pumping and drought influences will be addressed in this subtask. In addition, all wells within a radius of one mile of the site will be considered in the evaluation. This subtask will include an assessment of the buried pipeline on the site hydrology and contaminant migration.

Although the detailed scope of this task has not yet been defined, it is anticipated that several additional borings will be required to define off- site hydrogeology and the lateral limits of contamination. Two locations about 800 to 1000 feet west of the landfill may be considered, one downgradient of existing wells DW-1 and EW-1, and the other downgradient of DW-2 and W-5, to determine potential contaminant migration pathways downgradient of existing contaminated sites. Another potential location will be north of the landfill and to the south of Jensen Avenue, an area which has not yet been investigated. Since contamination has been detected in wells UW- 1 and UW-2, thought to be upgradient of the refuse prism, additional borings may be placed 500 to 1000 feet east of these wells to define the off-site and upgradient limits of contamination.

One pilot boring at each selected location will be drilled to sufficient depth and geophysically logged to allow correlation of geologic units with existing borings. The log will also provide a verification for selection of aquifer units to be screened. It is anticipated that at least three borings will be drilled at each location; each boring will be completed as a monitoring well to different depths to provide a means for determining groundwater quality.

Contamination has been found in the deepest monitoring wells located at the perimeter of the refuse prism. In order to determine the vertical extent of contamination, additional deep borings will be required at existing well cluster locations. Precautions will be taken during drilling, such as use of casing, to prevent contamination of the deeper zones during drilling. All deep on-site borings will be geophysically logged, to verify geologic logs and allow correlation of various strata. All borings, both on- and off-site will be logged by a qualified geologist. Selected samples will be obtained during drilling for analysis of physiochemical parameters (such as total organic carbon), to help determine contaminant fate and transport. More specific details regarding the hydrogeologic investigation will

be presented in the RI/FS Work Plan and SAP.

Although aquifer tests have been conducted at the site by previous investigators, the data are representative only of the aquifer material in the vicinity of the pumped well. Additional aquifer testing may be required to fully characterize the deeper site aquifers so that contaminant transport can be estimated. It is anticipated that at least one aquifer test will be conducted to determine aquifer properties of the principal aquifer zone below 100 feet, downgradient of the refuse prism. Appropriate borings will be drilled and wells installed to allow conduct of a test; existing wells will used as observation wells if possible.

5.3.5 Subtask 3E - Groundwater Investigation

Historical groundwater quality data are available for existing monitoring wells installed previously at the site. A wide range of organic contaminants have been detected. The objective of this task will be to monitor existing and new wells (installed during Subtask 3D), in accordance with a schedule to be determined in the RI/FS Work Plan, to document the extent of groundwater contamination for the risk assessment and to provide data for the development of groundwater remedial alternatives. A preliminary list of compounds to be analyzed have been presented in Section 3.0, RI/FS Objectives. Specific analytical techniques and associated detection limits, along with overall Data Quality Objectives, will be described in the RI/FS Work Plan and the SAP.

5.3.6 Subtask 3F - Residential Well Sampling

Approximately 12 residential wells have been identified in the vicinity of the landfill. These wells have been sampled by previous site investigators. The objective of this task will be to continue periodical sampling of residential wells in conjunction with on-site sampling programs to monitor water quality. These data will be input to the Risk Assessment, and will provide a means for EPA and the City to evaluate potential health threats to residents. In addition, these wells will function as off-site monitor wells to help establish the lateral extent of contamination for the deeper aquifer units.

5.3.7 Subtask 3G - Air Investigation

The objective of the air investigation task is to determine the impact of gas emissions through the surface of the landfill on the ambient air. Data obtained from this task will be utilized in the Risk Assessment to establish the baseline risk through the inhalation pathway prior to the implementation of remedial actions. The objective of this task is not intended to assist in the identification and evaluation of remedial actions.
The field work under this task consists of establishing ambient air samplers at locations of concern. Possible potential

receptors include people occupying residences on the north and south sides of the landfill, specifically on Jensen and North Avenues. Preliminarily, two samplers will be installed at background locations, one downwind and one upwind from the site. Data from these locations will assist in assessing the incremental impact of the landfill on the ambient air.

The specifics of the program in terms of length of sampling periods and constituents to be analyzed for will be developed as part of the field sampling plan. At a minimum, volatile organic compounds prevalent in landfill gas as well as oxygen, nitrogen, carbon dioxide, and methane will be analyzed.

5.3.8 Subtask 3H - Surface and Subsurface Soil Investigation

The objective of this task is to define the extent of any offsite soil contamination. The field work will consist of the investigation of both surface and subsurface soils proximal to the landfill. As an initial phase, samples will be obtained from the soil gas probe borings identified in Subtask 3C. Samples will be analyzed for a list of parameters to be determined in the RI/FS Work Plan.

5.3.9 Subtask 3I - RI Derived Waste

RI derived waste will be managed in accordance with the NCP and EPA guidance. Procedures for handling the waste will be established in the SAP.

5.4 Task 4 - Sample Analysis

Information gathered during site characterization will be consistently documented and adequately recorded by the respondent in well maintained field logs and laboratory reports. The methods(s) of documentation will be specified in the Work Plan and/or the SAP. Field logs will be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports will document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

The City will maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data of known quality are reported and utilized in the development of the risk assessment and evaluation of remedial alternatives. Analytical results developed under the Work Plan will not be included in any site characteri zation reports unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the City will establish a data security system to safeguard chain-of-custody forms and

other project records to prevent loss, damage, or alteration of project documentation. Existing data will be used to the extent possible, with appropriate data qualifiers.

The EPA's oversight contractor will develop the specific requirements for the data format, so that the format will be compatible with dBase III Plus software and an IBM PC or PS-2 computer. The City's contractor will be responsible for incorporation of any data validation results into the analytical database and will be responsible for assuring its completeness and accuracy.

5.5 Task 5 - Data Evaluation

RI and relevant pre-RI data will be summarized and evaluated. Validation will be entered into the site data management system for efficient comparison and sorting based on factors such as type of sample, location, parameter, and concentration.

After completing field sampling and analysis, the City will prepare a concise site characterization summary. The summary will review the investigative activities that have taken place, will summarize site contaminant data collected, and will document the locations and charac teristics of each affected medium investigated. The site characterization summary will provide EPA with a preliminary reference for developing the risk assessment, and evaluating the development and screening of remedial alternatives, and the identification of ARARs.

The City will then analyze and evaluate the data to determine the nature and extent of contamination, and contaminant fate and transport. The evaluation will include the magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models will be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. Analyses of data collected for site characterization will meet the DQOs developed in the QA/QC plan stated in the SAP (or revised during the RI).

5.6 Task 6 - Risk Assessment

All human health and environmental risk assessment aspects of this RI/FS will be performed by EPA. The baseline risk assessment will identify and characterize the toxicity and levels of hazardous substances present, contaminant fate and transport, the potential for human and environmental exposure, and the risk of potential impacts or threats on human health and the environment. The City and their contractor will be provided an opportunity to review and comment on the draft risk assessment,

pursuant to guidance.

5.7 Task 7 - Remedial Investigation Report

The City will prepare and submit, in accordance with EPA guidance, a draft RI report to EPA for review and approval. This report shall summarize results of field activities to characterize the site, nature and extent of contamination, the fate and transport mechanism of contaminants, and results of the baseline risk assessment. Following comment by EPA, the City will prepare a final RI report which satisfactorily addresses EPA's comments.

5.8 Task 8 - Remedial Alternatives Development

The purpose of developing and screening alternatives is to produce a reasonable range of waste management options to be analyzed more fully in the detailed analysis of alternatives. Developing alternatives includes the following elements:

- Establishing remedial objectives
- Developing general response actions
- Combining medium-specific technologies to form alternatives
- Screening alternatives, if necessary

The preliminary remedial action objectives will be refined for each medium based on the results of the site characterization and the baseline risk assessment. The final remedial action objectives will specify the following:

- The contaminants of concern
- Exposure routes and receptors
- Remediation goals for each exposure route

The revised remedial action objectives will be documented in a technical memorandum, entitled Technical Memorandum Documenting Revised Remedial Action Objectives.

The City will assemble selected representative technologies into alternatives for each affected medium or operable unit. These technologies will be documented in the Technical Memorandum Identifying Candidate Technologies. Together, all of the alternatives will represent a range of treatment and containment combinations that will address either the site or the operable unit as a whole.

The City will refine the remedial alternatives to identify contaminant volume addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information will be collected for an adequate comparison of alternatives. Remedial action objections for each medium will also be refined as necessary to incorporate any new risk assessment information being generated from the remedial investigation. Additionally, action-specific ARARs will be updated as the remedial alternatives are refined.

The City may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. This screening process will be used only if there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis.

As appropriate, the screening will preserve the range of treatment and containment alternatives that was initially developed. The City will prepare a technical memorandum, entitled Technical Memorandum on Remedial Technologies, Alternatives and Screening, summarizing the results and reasoning employed in screening, arraying alternatives that remain after screening, and identifying the action-specific ARARs for the alternatives that remain after screening.

As required, a no-action alternative will also be retained through the development and the evaluation of the alternatives.

If screening of alternatives is needed (based on number), the alternatives that are developed will be evaluated with respect to effectiveness, implementability, and the relative gross cost. The purpose of this evaluation would be to compare alternatives and to identify and retain those that are approximately equal in effectiveness and implementatibility, but lower in cost. Tools that will be used to assign costs to the alternatives include cost curves, generic unit costs, vendor information, and conventional cost estimating guides.

5.9 Task 9 - Alternatives Evaluation

The final alternatives will be evaluated to provide EPA with a framework with which to select a remedy for the site. The detailed analysis of these alternatives will be conducted in three stages: further refinement, individual analysis, and comparative analysis.

Further refinement of the alternatives will include developing detailed information such as:

. Identifying design parameters for technology components such as landfill cap, groundwater extraction and treatment system, and landfill gas collection and treatment system.

. Quantifying amounts of contaminated soils to be handled, if any.

. Estimating time of implementation for construction activities.

. Estimating O&M requirements, particularly for a groundwater pump and treat system and a landfill gas treatment system.

. Process sizing.

Most of this information will be used to develop a cost estimate within plus 50 percent and minus 30 percent.

During the individual analysis, each alternative will be evaluated with respect to the nine evaluation criteria, as specified in the National Contingency Plan:

. Overall protection of human health and the environment
. Compliance with ARAR's
. Long-term effectiveness and permanence
. Reduction of toxicity, mobility, or volume through treatment
. Short-term effectiveness
. Implementability
. Cost
. State acceptance
. Community acceptance

For each alternative, the City should provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment. If the City does not have direct input on criteria (8) state acceptance and (9) community acceptance, these will be addressed by EPA.

The City will perform a comparative analysis among the remedial alternatives. That is, each alternative will be compared against the others using the evaluation criteria as a basis of comparison. In addition, the comparative analysis will include a description of the strengths and weaknesses of the alternatives relative to one another. Identification and selection of the preferred alternative are reserved by EPA, in development of the proposed plan.

The City will prepare the Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives.

5.10 Task 10 - Treatability Studies

Treatability studies are bench or pilot scale trials of clean up technologies, using the actual contaminated materials from the site. Treatability testing may be performed by the City to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions will be used in the detailed design of the selected remedial technology. The need for treatability studies will be determined by the City, subject to approval by EPA. If treatability studies are recommended, the following activities will be performed.

The City will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. If practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for this site on the basis of available information, treatability testing will be conducted.

Once a decision has been made to perform treatability studies, the City and EPA will decide on the type of treatability testing to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as perform testing for various operating conditions, the decision to perform pilot testing for various operating conditions should be made as early in the process as possible to minimize potential delays of the FS. To assure that a treatability testing program is completed on time, and with accurate results, the City will either submit a separate treatability testing work plan or an amendment to the original site work plan for EPA review and approval.

The deliverables that are required when treatability studies are conducted include a work plan, a sampling and analysis plan, and a final treatability evaluation report. EPA may also require a treatability study health and safety plan, where appropriate.

The City will prepare a treatability work plan or amendment to the original site work plan for EPA review and approval describing the site background, remedial technologies to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for treatability testing should be documented as well. If pilot-scale treatability testing is to be performed, the pilot-scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be

tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed off-site, permitting requirements will be addressed. If the original QAPP or FSP is not adequate for defining the activities to be performed during the treatability tests, a separate treatability study SAP or amendment to the original site SAP will be prepared by the City for EPA review and approval.

Following completion of treatability testing, the City will analyze and interpret the testing results in a technical report to EPA. Depending on the sequence of activities, this report may be a part of the RI/FS report or a separate deliverable. The report will evaluate each technology's effectiveness, implementability, cost and actual results as compared with predicted results. The report will also evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

5.11 Task 11 - Feasibility Study Report

Following completion of the detailed evaluation task, the City will prepare and submit a draft FS report for the FSL to EPA for review and comment. The report will summarize FS activities and RI site characterization results and will be prepared in accordance with RI/FS Guidance (U.S. EPA, 1988a). Information developed during the FS such as identification of ARARs, detailed description of alternative, and detailed evaluation of alternatives will be provided to EPA as these sections are completed in order to obtain input from EPa during the evaluation process. The City will prepare a final FS report which will satisfactorily address EPA's comments.

6.0 SCHEDULE

The City has developed a modular scheduling approach, since work planned for some distance into the future involving field tasks cannot be accurately scheduled. The work has been divided into four different modules. The deliverables in each module are as follow:

Module 1: RI/FS Work Plan, Health and Safety Plan, Sampling and Analysis Plan (SAP).

Module 2: Preliminary Site Characterization Summary

Module 3: RI Report, Treatability Testing Deliverables (if appropriate)

Module 4: Technical Memorandum Identifying Candidate Technololgies, Technical Memorandum Documenting Revised Remedial Action Objectives, Technical Memorandum on

Remedial Technologies, Alternatives, and Screening, Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives, Feasibility Study (FS) Report

The best estimate for the work schedule incorporating the modular approach above is as follows:

Module 1 - Project Planning

1. Draft RI/FS Work Plan
   Health and Safety Plan

Due: 10 weeks after signing of the Consent Decree.

Revision Period: 30 days after receipt of EPA comments or 30 days after meeting with EPA to discuss comments, whichever is longer.

2. Sampling and Analysis Plan (including QAPP)

Due: 12 weeks after signing of the Consent Decree.

Revision Period: 30 days after receipt of EPA comments or 30 days after meeting with EPA to discuss comments, whichever is longer.

Module 2 - Data Collection/Site Characterization

1. Initiation of Field Tasks

Due: 10 weeks after EPA approval of revised SAP.

2. Preliminary site characterization summary.

Due: 27 28 weeks after initiation of field tasks.

Revision Period: 30 days after receipt of EPA comments or 30 days after meeting with EPA to discuss comments, whichever is longer.

Module 3 - Data Evaluation/Treatability Testing

1. Draft RI Report

Due: 15 18 weeks after EPA approval of preliminary site characterization summary.

Revision Period: 45 days after receipt of EPA comments or 45 days after meeting with EPA to discuss comments, whichever is longer.

2. Treatability Testing Statement of Work

Due: To be determined, if deemed appropriate by City of Fresno with EPA approval.

Revision Period: 30 days after receipt of EPA comments.

3. Treatability Testing Work Plan

4. Treatability Study Site Health and Safety Plan

5. Treatability Study Evaluation Report

Module 4 - Feasibility Study

1. Technical Memoranda

Due: Schedule to be presented in the RI/FS Work Plan

2. Draft FS Report

Due: 12 weeks after EPA approval of Treatability Study Evaluation Report; if treatability testing not performed, 20 weeks after EPA approval of RI report.

Revision Period: 45 days after receipt of EPA comments or 45 days after meeting with EPA to discuss comments, whichever is longer.

Revision periods estimated herein do not include additional data gathering or laboratory analysis.

2146-1:2